

marked than in that of nitrogen, while the curve of air lies between the two. Further, hydrogen is the only gas not exhibiting a minimum of the product of pressure and volume. As hydrogen is, so to say, the most perfect gas known, it would seem probable that on being forced to assume a state of tenuity allied to that of hydrogen, *i.e.*, by being exposed to elevated temperatures, the other gases experimented upon would yield curves resembling more and more that of hydrogen, until finally temperatures would be attained at which the convexity of the curves would totally disappear. The results chronicled by M. Amagat, taken in connection with those ascertained by other investigators in experimenting upon gases compressible at ordinary temperatures, would fairly allow the establishment of a law that when a gas on being compressed gives constantly increasing numbers for the product of the pressure by the volume—which according to Mariotte's law should remain unity—it is at a temperature above its critical point; or, to use Dr. Andrews' apt description, without actual liquefaction it can pass by means of pressure alone through all the intermediate stadia between the gaseous and the liquid states.

M. Amagat's interesting researches will, it is to be hoped, be followed by similar experiments executed under a wider range of temperature on the various gases; the results of which will, without doubt, throw much valuable light on the phenomena and conditions of liquefaction. Apart from their purely scientific interest, the tabulated records of his observations furnish to the engineer data of the greatest value, enabling him to construct manometers combining exactness and delicacy for the indication of high pressures, which hitherto have been measured with but a certain degree of approximation to the truth.

T. H. N.

NOTES

DR. M. TREUB has been appointed director of the Botanical Gardens at Buitenzorg, Java.

WE are glad to learn that the collections from Socotra, which Prof. Bayley Balfour was compelled to send by sea from Brindisi, have arrived safely at Kew Gardens.

AT Dorpat a monument is about to be erected to the memory of the celebrated naturalist, Karl Ernst von Baer, who died at Dorpat on November 28, 1876. The funds will be supplied by the Dorpat University and the Imperial Academy of Sciences at St. Petersburg. The eminent sculptor, Herr Franz von Villebois, has made two excellent sketches for the monument.

AT a recent meeting of the Court of Common Council, at which the Lord Mayor presided, it was resolved that the freedom of the City of London in a suitable gold casket be presented to Sir Henry Bessemer, F.R.S., M.I.C.E., in recognition of his valuable discoveries, which have so largely benefited the iron industries of this country, and of his scientific attainments, which are well known and appreciated throughout the world.

ON August 5, as we have already announced, the exhibition of anthropological and prehistoric objects found in Germany will be opened at Berlin. At the same time the general meeting of the German Anthropological Society will take place. No less than 114 archaeological, eight palæontological, and sixteen craniological museums will send objects to this exhibition. The objects found in the Loess strata will be particularly interesting, and besides these we may point to the objects found in caves and in moors.

THE British Medical Association will be well received at Cambridge in August, not only by the University but in the town; the Town Council have granted the Guildhall free of cost. The president of the Physiological Section, Dr. Rutherford, will give his address on Wednesday, August 11, at 2 o'clock, and there will follow a discussion on the subject, "Is Urea

formed in the Liver?" to be opened by Prof. Gamgee, of Manchester; on August 12 Prof. W. Preyer, of Jena, will open a discussion on "Sleep and Hypnotism." Drs. Gaskell (Cambridge) and Stirling (Aberdeen) are the secretaries of this Section.

PROF. MILNE, of Tokei, Japan, who has made a trial of almost every seismoscope in existence, and has devoted all his leisure to seismometry for several years, has exerted himself successfully to interest the Japanese officials in establishing a suitable system of earthquake observation, as well as the Europeans in Japan, who have lately formed a society for the purpose of systematically studying seismic phenomena. Mr. Milne has obtained the assistance of the Government in having immediate telegraphic communication concerning earthquakes, and he aims at getting from telegraph operators throughout the country information concerning earth currents during earthquakes. If we consider the importance of studying the matter systematically in a country where small earthquakes occur every few days, and where the people are all greatly interested, it must be evident that this society will have a promising future.

A CONGRESS of the Members of the Royal Agricultural College, Cirencester, of former Students and Professors of the College, and of others interested in Agriculture, will be held in the College on Friday, June 4, 1880, under the Presidency of the Principal. At the Morning Session at 10 a.m. the subject for discussion will be—"Diseases in Cattle and Sheep, with especial reference to recent outbreaks," introduced by a paper by Prof. Buckman, F.G.S., F.L.S., on "The Natural History of Meadow and Pasture, in connection with such Diseases." At the afternoon session at 3 p.m. the subject for discussion will be—"Agricultural Research and Experimental Stations," introduced by Prof. Henry Tanner, M.R.A.C., F.C.S.

IN connection with the subject of "Fungus Inoculation of Insects," a Heidelberg correspondent, "O. S.," sends us for publication the following beautiful and little-known poem, by Goethe (1810, Poems, vol. ii.):—

DER FLIEGENTOD

"Sie saugt mit Gier verräth'risches Getränke
Unabgesetzt, vom ersten Zug verführt;
Sie fühlt sich wohl, und längst sind die Gelenke
Der zarten Beinchen schon paralytisch;
Nicht mehr gewandt, die Flügelchen zu putzen,
Nicht mehr geschickt, das Köpfchen aufzustutzen—
Das Leben so sich im Genuss verliert.
Zum Stehen kaum wird noch das Fißschen taugen;
So schlürft sie fort und, mitten unterm Saugen,
Umnebelt ihr der Tod die tausend Augen."

DR. WERNER SIEMENS, the well-known German electrician, had been instructed, a few years ago, to manufacture a series of standard weights on behalf of the Egyptian Government, which wished to adopt the German system; but as the Egyptian Government did not fulfil its financial obligations Dr. Siemens kept the set of weights in his workshop, where they were used for various purposes. On the occasion of the visit of the weights and measures inspector these weights were discovered, and Dr. Siemens summoned before the police. The case has been tried with some solemnity, and Dr. Siemens fined 2 marks.

A REMARKABLE phenomenon was observed at Kattenau, near Trakehnen (Germany), and in the surrounding district, on March 22. About half an hour before sunrise an enormous number of luminous bodies rose from the horizon and passed in a horizontal direction from east to west. Some of them seemed of the size of a walnut, others resembled the sparks flying from a chimney. They moved through space like a string of beads, and shone with a remarkably brilliant light. The belt containing them appeared about 3 metres in length and $\frac{1}{2}$ metre in breadth.

THE Mitchell Library of Glasgow, which was opened in 1877, has already attained considerable dimensions, and under the careful organisation of the principal librarian, Mr. Barrett, promises to be of great service as a consulting library. It now possesses 16,828 works, or 27,982 volumes, a large proportion of which are scientific. Of the volumes issued in 1879 193 per cent. belonged to the division of "Arts, Sciences, and Natural History"—rather a curious division, by the by. This percentage was excelled only by History, Biography and Travel, and "Miscellaneous."

THE eminent physicist, Dr. Rudolf Clausius, of Bonn, has been elected a member of the Roman Academy "dei Lincei."

THE Secretary of State for Foreign Affairs of the Republic of San Domingo has issued a circular to the Ministers of England, America, France, Italy, Spain, Holland, and Denmark, soliciting their co-operation in the erection of a monument to Christopher Columbus in the city of San Domingo.

THE Lisbon Academy has decided to ask the consent of the Government to transfer the bones of Vasco da Gama from Vidigueira Alem^{to} to the church of the Jeronimites, Belem. It is proposed that a deputation of the Academy should accompany the remains of Vasco da Gama, and a war ship convey them from Barceira, on the banks of the Tagus, to the Lisbon Arsenal.

ADMIRAL MOUCHEZ, the Director of the Paris Observatory, has published a pamphlet on the work executed in this establishment during the year 1879. A new decree quoted by M. Mouchez arranges that the several *employés* of the Observatory, when not too old, can be admitted to follow the course of lectures given at the School of Astronomy recently created, and are fit to be appointed astronomers if successful in their examinations. The establishment is to be enlarged in the vicinity of Boulevard Arago, the admission of the public to be more frequent, and the magnetical observations to be resumed. The meteorological observations have been continued, and are to be in some respects enlarged, although no change is contemplated in the organisation of the Bureau Centrale and the Service d'Avvertissements, which will continue for ever independent of the astronomical observatories.

THE *Sydney Morning Herald* records the death of Mr. Edward Smith Hill on March 17, sixty-one years of age. He was a native of Sydney, and after retiring from business devoted his time to scientific investigations for the last eighteen years. He made a voyage to the South Sea Islands, and wrote some valuable papers and pamphlets on their flora. He wrote for the New South Wales Government a report on the flora of Lord Howe Island, and the condition of its European inhabitants. Among his contributions to Sydney journals was a series of articles describing the fishes found in the harbours and rivers of New South Wales and along the coast.

THE work of examining the 5,000 *employés* of the Pennsylvania Railroad Company as to their power of distinguishing colours and forms was begun in Jersey City on April 1. Acuteness of vision was tested by means of printed cards placed at a distance of twenty feet; also by means of small openings in a screen illuminated on the further side. Many who successfully passed these ordeals failed signally in the colour tests. Three skeins of woollen yarn were used, one being light green, the second rose, and the third red. Each of these was placed on a table in front of the person examined, at a distance of three feet, and, with the vision of either eye obstructed by a spectacle frame, the man was requested to name the colours, also to pick out a similar shade to one or other of the three specified from different skeins of woollen yarn numbered from 1 to 36. One young man correctly designated the test skein as red, but on being told to select a similar shade from the skeins before him, he picked

three shades of blue, two of yellow, and one of red. He could distinguish no difference; and the same thing happened to half-a-dozen others who followed him. The skeins in the row were then divided into three sets with twelve numbers in each. Some men proved able to distinguish all the shades of green, but failed lamentably in picking out the different shades of red. The officers of the road were greatly impressed, it is said, by the results obtained.

ON April 1 a "Society for Zoology" was formed at Berlin, with a view of furthering zoological science and zoological research in all its branches. The president is Dr. Eduard Kaiser (27, Friedrich Strasse), who will furnish all particulars to intending members.

AT Paris a Society "contre l'abus du tabac" has been formed, which intends to combat the excessive indulgence in smoking which has of late become the fashion in almost the whole of Europe. The Society offers various prizes for treatises on the human health and the dangers it is subject to from excessive use of tobacco.

THE *Times* Geneva correspondent writes, under date May 12, that a few days before, during a violent thunderstorm, a tall poplar on the Cour de Rive, a street in the upper part of Geneva, was struck by lightning. Directly after the occurrence Prof. Colladon made a minute examination of the tree. The Professor states that it is not true, as has been commonly supposed, that the gashes (*plaies*) found in the trunk of a tree which has been struck by lightning are the parts with which the lightning first came into contact. The parts first struck are the highest branches, especially those most exposed to the rain. Thence it runs down the smaller branches—affecting almost the whole of them—to the larger ones, until it reaches the trunk. These larger branches, and above all the trunk, being much worse conductors than the small branches, the passage through them of the electricity produces heat and "repulsive effects," whereby the bark and sometimes the wood are torn in pieces, the bits being thrown a considerable distance, occasionally more than 50 metres. It not infrequently happens that the upper branches and their leaves are destroyed—this is generally the case with oaks, which are often struck—but the leaves and young shoots of poplars and many other trees are such excellent conductors that they do not appear when struck to suffer any notable injury. This finds full confirmation in the condition of the poplar on the Cour de Rive. In this instance the principal and highest branch of the tree on its south-western side was the first with which the lightning came in contact. Its leaves and twigs, neither withered nor tarnished, were torn into minute fragments and scattered about on the ground. This was the effect, not of the lightning, but of the concussion of air, exactly as if there had been an explosion of dynamite or gunpowder; and the windows of two houses close by were broken in the same manner and by the same cause. The presence of water near the root of a tree is often the determining cause of its attraction for the electric fluid; and the Professor found, 5 metres from the poplar, on its north side, a leaden water-pipe, and close to it a drain filled with waste water from a laundry. The principal fissure in the tree was also on the north side; and half-way between it and the water-pipe a plank lying on the ground had been pierced by a concentrated jet of the electricity as it flashed towards the pipe by the shortest route. Large trees, especially tall poplars, placed near a house, may serve as very efficient lightning conductors, but always on the indispensable condition that there is no well or running water on the opposite side of the house, for in that case the lightning, if it struck the tree, might pass through the building on its way to the water. In erecting lightning conductors it is desirable that their lower extremities should terminate in a stream, a well, or a piece of

damp ground. The plant most sensible to electricity is the vine. When a stroke of lightning falls in a vineyard the leaves affected are turned red-brown or deep green, a circumstance which shows, in the opinion of Prof. Colladon, that the electricity descends in a sheet or shower, and not in a single point, the number of vines touched—sometimes several hundred—by a single *coup* proving that the lightning has covered a wide area.

THE oldest librarian of the Royal Library at Berlin, Dr. Buschmann, died recently at the advanced age of seventy-five years.

A NEW "Illustrirte Naturgeschichte der Thiere," by Philipp Leopold Martin, with numerous illustrations by F. Specht, R. Friese, R. Kretschmer, A. Göring, and L. Martin, jun., will soon be published in two volumes (or fifty parts), by F. A. Brockhaus, of Leipzig. The first volume will contain the chapters on mammals and birds; the second the remaining vertebrates and the whole of the invertebrates.

THE Archæological Society of Athens has purchased about half the village which stands upon the ruins of the Temple of Eleusis. The Society intends building new dwelling-houses in another part, and to begin with excavations as soon as the present inmates of the village have moved.

THE astronomer, Herr Rudolf Falb, well known through his theory of earthquakes, has returned from his South American exploring tour, which extended over a period of more than two years. In his researches he was led in the direction of ethnography and linguistics, and believes that he has made interesting discoveries regarding "the original language of the human race."

IN the vicinity of Milan pile-dwellings have been discovered in a peat-moor, and the foundations of a Roman theatre in the city itself.

"DIE deutsche Arbeit in fremden Erdtheilen" is the title of an interesting lecture recently delivered by Dr. Karl von Scherzer at the Leipzig Gemeinnützige Gesellschaft. It is published by Rossberg, of Leipzig.

THE new Indian Section of the South Kensington Museum, formed from the late India Museum, was opened to the public on Monday.

IT has been resolved to establish a Museum of Science and Art in Aberdeen.

AN experimental department has been established at the Conservatoire des Arts et Métiers in the large hall, where the engines are set in operation every Sunday and Thursday from eleven to six o'clock. Advantage has been taken of the motive power to put in operation a number of Gramme and Alliance machines. After having been exhibited during a fortnight, the instruments will be replaced by others, and so on indefinitely.

DR. JAMES GEIKIE, F.R.S., has been elected President of the Perthshire Society of Natural History, in succession to the late Sir Thomas Moncrieffe. From his address at the annual meeting of the Society we are pleased to see that the local museum to be established by this enterprising Society is making good progress, and promises very soon to be a *fait accompli*. Dr. Geikie gave expression to some wholesome truths as to the functions of such a local museum, the great purpose of which ought to be to fully illustrate the natural history, geology, and antiquities of the surrounding region. This, we are glad to think, is what the Perth Museum promises to be, and it ought, therefore, to prove one of the best local museums in the kingdom, seeing that all in all, from a scientific point of view, Perth is probably the most comprehensive and representative county, as it is among the largest, in our islands.

IN a gravel pit near the town of Posen a mammoth-skull has been discovered, but unfortunately in pieces. Most of the pieces, however, are well preserved—the facial bones alone weigh 28 lbs.

AN earthquake, accompanied by a loud subterranean noise, is reported from Ilanz, in the Swiss canton of Graubünden. It occurred on April 27 at 3.30 a.m. A smart earthquake shock, coinciding with that at Villeneuve, and accompanied by subterranean noises, was felt at Jarasp and Ardez, in the Engadine, on the 7th inst.

THE centenary of the birth of Gotthilf Heinrich von Schubert, the celebrated naturalist, was celebrated at Hohenstein on April 26. A monument of Schubert was unveiled, and some 500*l.* have been collected for the foundation of a preparatory school for little children, under the name of Schubert-Stift.

A NEW French Society of Agriculture, "The National Society for the Encouragement of Agriculture," held its first meeting on May 15 at the Hôtel Continental, Paris, M. Fouché de Careilles, Senator, in the chair. The President of the Republic and the most prominent members of the French Government are said to take interest in the new society.

AN ostrich, long on exhibition at Rome, having been suffocated by thrusting its neck between the bars, there were found in its stomach four large stones, eleven smaller ones, seven nails, a necktie pin, an envelope, thirteen copper coins, fourteen beads, one French franc, two small keys, a piece of a handkerchief, a silver medal of the Pope, and the cross of an Italian order.

A REMARKABLE discovery has recently been made near Hirschberg, in the Riesengebirge (Silesia). In a locality called Weltende, at the entry into the narrow rocky mountain ravine through which the Bober flows, a large heap of bones of diluvial mammals was found, such as pieces of reindeer horns and bones of *Elephas primigenius*, prehistoric ox, &c. The discovery is important, because it proves the former occurrence of the large mammals of the diluvial period even in this elevated valley of the Sudeten mountain-chain.

DR. BECLARD has introduced at Paris, in the buildings where the old Rollin College has been so long established, a new mode of demonstration for physiological experiments on living animals. A circular barrier has been erected round a space where a movable table is arranged on rails. The animal being placed on the table, it is easy to understand that the experiments can be witnessed by each pupil consecutively.

NEAR Bautzen (Saxony) an ancient burial-ground has been discovered. Up to the present not less than 400 antique objects, such as urns, well-preserved "tear-vases," sixteen bronze and iron rings, a head ornament, needles, and buttons were found.

THE additions to the Zoological Society's Gardens during the past week include a Pig-tailed Monkey (*Macacus nemestrinus*) from Sumatra, presented by Mr. J. M. Donovan; a Bennett's Gazelle (*Gazella bennetti*) from India, presented by Mr. Harvey Chevallier; four Rose-coloured Pastors (*Pastor roseus*) from Smyrna, presented by Mr. M. S. Bayliss, C.M.Z.S.; six Paradise Whydah Birds (*Vidua principalis*), two Yellow-backed Whydah Birds (*Coliopsis macrurus*), a White-winged Whydah Bird (*Urobrachya albonotata*), twelve Red-beaked Weaver Birds (*Quelea sanguirostris*) from West Africa, presented by Mr. J. Colman, C.M.Z.S.; a Goffin's Cockatoo (*Cacatua goffini*) from Queensland, presented by Mr. W. T. Green; three Young Lions (*Felis leo*) from Africa, a Grey-cheeked Monkey (*Cercopithecus albigena*) from West Africa, a Red-throated Amazon (*Chrysotis collaria*) from Jamaica, deposited; two Common Bluebirds (*Sialia wilsonii*), two Yellow-legged Herring Gulls (*Larus cachinnans*), bred in the Gardens.